
AMSAT SATELLITE REPORT



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AMSAT Staff Changes Reflect Phase IIIB Completion

With the completion of the Phase IIIB spacecraft at hand, several major changes in AMSAT staffing levels are imminent. First, AMSAT Vice President for Engineering, Jan King, W3GEY, will be reverting to volunteer status. For the past several years Jan has been an employee of AMSAT and has led AMSAT's effort to construct the Phase IIIA and Phase IIIB and C spacecraft. Now, having largely completed that effort, Jan will be going on to a consulting business in the aerospace industry. However, he will remain an invaluable part of the Phase III program and of AMSAT. He will continue living in suburban Maryland and participate fully in AMSAT activities. "In fact," Jan observes, I'm certain that over the eleven years I've been doing these things, I've contributed more to the programs as a volunteer than as a paid employee. So thoughts that the end of my direct involvement and strong participation in AMSAT are simply wrong!"

Gordon Hardman, KE3D/ZS1FE and Molly Hardman, N3CHZ/ZS1KE, will be leaving the Washington, D.C. area and heading home to South Africa. But not before they have seen a bit of what these United States has to offer. Both are planning a cross country drive beginning around 22 July and ending up in San Francisco in three weeks or so. Gordon has been employed by AMSAT in its intern program for a year and a half. Molly has been employed at NASA's Goddard Space Flight Center at Greenbelt Maryland as a programmer/analyst. Gordon will be taking home with him much of the knowledge and techniques learned while at the AMSAT lab in hopes of inoculating the crew at home in ZS with the stuff to begin and bring to fruition the first African amateur radio satellite. Gordon and Molly are both enthusiastic about the likelihood that their native land will produce at least a major portion of a future satellite beginning almost immediately.

ASR and AMSAT wishes our former employees and continuing friends all the best in their new endeavors!

Last Chance For Nominations

Nominations for Director must be postmarked no later than 31 July 82 to be valid. Please nominate your choice and vote in the election.



AMSAT VP W3GEY caught in a relaxed moment recently at Dayton. (See accompanying story.)

Porta J Terminal Reaches Goal

In a surprise of the most pleasant kind, AMSAT President Tom Clark, W3IWI, announces that the equipment needed to complete the Porta J terminal (See ASR 36, 37) will be provided by a grant from the Hoover Foundation. Administered by Mr. Pete Hoover, W6ZH, the Foundation has been a frequent and generous benefactor of AMSAT. The grant from the foundation will provide the two-meter transceiver and the 10-meter receiver needed to complete the planned equipment suite along with some minor accessories such as cables and support hardware. AMSAT members extend their thanks again to W6ZH!

The plan for the portable Mode J terminal now moves to the second phase which involves configuring the equipment for easy shipment and installation/erection at field locations such as hamfests, schools and the like. If the plan proves successful, the package will be augmented with Mode B and perhaps Mode L equipment next Spring to be compatible with Phase IIIB. Thanks again to all who made this effort a resounding success!

Editor's Note: Due to the high volume of volatile news this week, the next installment of Phase III Countdown will be postponed to the next edition of ASR.

UoSAT Rescue Involves Major Resource

ASR has learned that a 46-meter (150 foot) parabolic dish antenna in California has been brought on line in an effort to overcome the persistent commanding problems with UoSAT experienced to date. The dish, government owned, is under the custodial care of SRI International (formerly Stanford Research Institute). There, near Menlo Park in northern California, the latest, perhaps last, attempt will be made to salvage the University of Surrey amateur scientific satellite mission.

In review, the satellite was launched 6 October, 81 from Vandenberg Air Force Base, California. The engineering evaluation phase (debug) was unusually protracted when minor difficulties arose. Among those early difficulties were problems in getting the long command sequence through to the spacecraft when it was tumbling slowly and uncontrollably. Finally, in late Spring, it appeared that all was in readiness and testing of the various on-board experiments had provided encouragement for the Surrey team and potential users alike. Indeed, the CCD camera had been turned on and a test frame obtained. Attitude stabilization was about to begin when disaster struck. In mid-April it was reported that, due to a command software error, both the 2-meter and 70-cm beacons had been commanded on simultaneously. The presence of both beacons simultaneously effectively desensed both command receivers (one each of 2 and 70 cm) such that commanding the spacecraft thereafter has proven impossible. (See ASR 31 and 33.) Despite the heroic efforts of Dave Olean and his monster 2-meter EME array (26 dBd at 144.05 MHz; see ASR 35) UoSAT continues in its catatonic state.

The effort at SRI International effectively began when Dr. Robert S. Leonard, KD6DG, happened to overhear a QSO on a local repeater. The discussion concerned the plight of UoSAT. KD6DG joined in the QSO and learned enough from the QSO to suggest to him that the SRI dish might be employed to UoSAT's benefit. He later contacted Dr. Martin Sweeting, G3YJO, the UoSAT Program Manager at the University of Surrey, England. Together Martin and Bob developed a plan that would place the SRI dish in service using a command encoder that Martin would supply for the effort.

The first attempts from the SRI dish were made on 2 meters on 11 July mostly as an exercise to see what had to be done to get the big dish into operating condition. The SRI dish had been out of service for several years. The most recent use had been to establish an amateur radio EME link with the world's largest (single dish) radio telescope, the Arecibo dish in Puerto Rico.

A number of minor problems appeared almost immediately. For example, although the vintage PDP-8 computer which controls the dish pointing was still in tact, the computer which generated the tracking tapes for the PDP-8 input had been scrapped. No computer, no tracking. Dr. Leonard indicates that a work-around plan is being developed to help with the tape generation problem. Another minor problem surfaced with the drive mechanism. "Some repairs will take care of that," Bob says.

The SRI dish itself has some impressive specs. When operated at 435 MHz, the dish yields about 42 dBd gain. Expressed differently, fed 750 watts at the feed point, the dish has an effective radiated power of nearly 12 MEGAWATTS! As one AMSAT pundit, who wished to remain anonymous put it, "At these flux levels UoSAT will respond to command...or incandesce...or both. The only real question is which will occur first!"

Other relevant specifications of the dish, according to Bob, KD6DG, include the elevation slew rate (downward) of 46 degrees per minute. The azimuth slew rate attainable at present is unknown. The beamwidth at 70 cm is about 0.6 degrees (at the -3 dB points) so pointing accuracy is essential. The pointing accuracy is said to be about 0.1 degree (6 minutes of arc) so that consideration seems to have been accommodated. Position information is provided by digital encoders that feed back to the controlling PDP-8. The PDP-8 controls the drive mechanisms which use electrical motors to drive hydraulic motors to move the dish.

The team which is forming at SRI to engage the UoSAT salvage mission includes, as its nominal head, Dr. Leonard, who is Director of the Radio Physics Laboratory at SRI International. His team comprises, at the moment, Doug Lee, K6TDR; Roy Long, W6YBL; Hank Olson, W6GXN. Others involved in various ways include Bob Foss, WA6DIA; John Pronko, W6XN; Cliff Buttschardt, W6HDO.

According to KD6DG, a special effort would be made to have the SRI dish up and running by Saturday, 17 July, so that the team could advantage itself of some favorable UO-9 orbital aspects over the Pacific on Saturday and Sunday. The chance of successfully commanding the spacecraft is improved when the satellite is in remote areas so that QRM from amateurs does not interfere with the command uplink. This occurs most often when the bird is over oceans so that is where the SRI team will be looking for UoSAT.

Watch ASR and your AMSAT nets for word on the effectiveness of this latest bold attempt to extricate UoSAT and rejuvenate the ambitious plans associated with the first amateur scientific satellite.

Storm Closes 75-Meter Nets

Some of the strongest geomagnetic storms ever conspired to close down the regular East Coast AMSAT 75-meter net on 14 July. This is the first time in anyone's recollection that disturbances have been intense enough to totally disrupt the 75 meter net. Recently, however, the weekend International 20 and 15-meter nets have been wiped out several times by storms. The result has been that many avid listeners outside the USA have been isolated from the nets for weeks. The situation will clarify, most likely, with Autumn propagation conditions although this solar cycle is now thought to be the second most active and longest lasting of any for which records are available according to the ARRL propagation report/forecast. Meanwhile, the long-term solution is better satellites and higher frequencies which are less affected by solar disturbances and their affect on the ionosphere.

New Restrictions Cloud 70-cm Operations

In a July 14 bulletin, ARRL has announced that serious new restrictions will be placed on amateurs living near key military installations with regard to their 70 cm transmitter power. The ARRL Bulletin #62 is herewith reproduced in part.

"Effective August 16, 1982, because of National Defense considerations, the 50-watt transmitter power limit for amateur stations operating in the 420 to 450 MHz band will be extended to two additional military areas. Also, the restricted areas around two military locations already covered by the rules will be enlarged. The 50-watt power limit will apply to the following areas except when authorized by the appropriate FCC Engineer In Charge and military area frequency coordinator.

Otis Air Force Base, Massachusetts, 100 mile radius

Beale Air Force Base, California, 150 mile radius

Elmendorf Air Force Base, Alaska, 100 mile radius

Grand Forks Air Force Base, North Dakota, 100 mile radius"

ASR believes the new restrictions are associated with the imminent operations of a new defensive radar system at the cited bases. The radar nicknamed Pave Paws is installed at Otis and Beale and operate in the 400 MHz range. These installations use huge phased array radars with multimegawatt peak power. Typically they can spot an object the size of a grapefruit at a thousand miles or more. Amateurs in Massachusetts and California have been wary of the operational phase of these radars. Their apprehension stems, it seems, not only from the announced restrictions, but from the likely possibility that interference with 70-meter operations in and around the installations will occur because of the copious amounts of power associated with Pave Paws. ASR is uncertain what 400-MHz systems at Elmendorf and Grand Forks require protective measures (as herein reported) but a good guess is that they, like Pave Paws, are long range, missile defense radars.

It was not clear at press time whether the new restrictions apply en tota to stations in the amateur satellite service as well as normal (part 97) amateur radio service. As reported in ASR #1, the FCC in early 1981 provided relief to stations in amateur satellite service around Otis AFB and Beale AFB such that they could use up to 1 kW provided that the main lobe of the radiation pattern of the antenna was not less than 10° above the horizon. The petition for relief was filed by AMSAT to allow Phase III control operators the required up-link power.

ISKRA-2 Bites the Dust

According to AMSAT officials contacted by ASR, the fate of ISKRA-2 is likely finally determined as it has not been heard from in over a week at this writing. The last confirmed sighting was on 9 July with a "possible" sighting on 10 July. Moreover, during the lifetime of ISKRA-2 (and especially so in recent days) NASA had been updating the orbit reports 3 or 4 times per day. Now all is silence. If in fact ISKRA-2 is down, it will have only

partially fulfilled its mission. It was the first Amateur Radio satellite to be launched by a cosmonaut. (See ASR 33 and 34.) Jettisoned from the hatch of Salyut 7 on 17 May at 11:07 UTC, its lifetime was 8 weeks compared to the estimates of 6 weeks made at the time of its launch. Whatever ISKRA-2's primary mission was, it seems unlikely that it was realized for, despite earlier reports and several false alarms [including an embarrassing STOP PRESS announcement in ASR #34], nothing but the telemetry beacon was ever confirmed as being heard from ISKRA-2. If it carried a 15-to-10-meter transponder as had been announced, it remained mute throughout its short lifetime. Indeed, those who watch these things closely hinted that something was amiss when the usual fanfare that accompanies these satellite launches failed to materialize in the usual places (TASS, Sovetsky Patriot, etc).

What remains for the judges in the Chicken Little (the sky has fallen) contest is to determine, based on radar evidence, the precise time of ISKRA-2's demise. On that determination will ride the fate of several hundred entries in the contest. ASR will carry the winner's name as soon as the results are authenticated. Stay tuned to AM-SAT's nets for first word, of course!

New Correction Factors Told

A new set of correction factors to the Project OSCAR Orbital Prediction calendars has been issued. The most recent correction factors published here in ASR #37 had a few surprises. In fact, the AO-8 numbers were inaccurate by more than a minute. The error has been traced to the NASA predictions. The most recent predictions seem to be more in line with reality, however. The values of the correction factors to be added to the Project OSCAR calendar (as of 15 July) in seconds are:

AO-8, +88; RS-3, +44; RS-4, +17; RS-5, -62; RS-6, +4; RS-7, +30; RS-8, +24.

The following orbital data was calculated on 30 June 82. Basic orbital data:

Sat	Ref Orb 30 June	Period Minutes	Longitude Incr, deg	Ele Set
AO-8	01:28:41 94.7	103.17356	25.79579	668
UO-9	01:32:04 157.3	95.04025	23.75995	208
RS-3	00:13:56 109.9	118.518545	29.756436	27
RS-4	00:54:24 118.2	119.395351	29.975685	40
RS-5	01:11:31 122.2	119.554586	30.015543	34
RS-6	00:07:47 107.9	118.716580	29.805893	25
RS-7	01:05:13 121.4	119.196159	29.925897	40
RS-8	01:24:27 125.0	119.764412	30.068069	87

New Pacific DX Excitement

The extra-long range QSOs from Hawaii to ZL and VK continue. The latest episode was sown last week when Rick, WH6AMX worked ZL1QS on RS-6 July 5. The link between ZL, VK and WH6 has been worked several times recently using the long-range capabilities of the new RS birds plus, perhaps, a bit of range enhancement via F2 and sporadic E type propagation.

Big Ham Turnout Seen For Hot Air Event

The Warren County, Iowa ARES organization and the Des Moines Radio Amateur Association will be operating a special events station at the National Hot Air Balloon Championships held at Indianola, Iowa. Operations are scheduled from Friday evening, July 30th thru Sunday, August 8th and will include satellite communications as well as low-band capabilities. OSCAR-RS operation will include morning and evening passes during the weekends and evening passes during the week. This station will use A and J modes on the top of the down-link passbands and will be using the call-sign WØRPK.

Other interesting events planned include flying an amateur fast-scan television camera, transmitter and operator in a balloon on several flights. Color video will be received at the special events station for display and VHS recording. Interesting frames will be used for slow-scan transmission on the low-bands. Tks WØRPK.

CN8CO Back On The Birds

WØCA reports that Abdul, CN8CO, is back on the birds. Look for him, in particular on RS-6 and 8.

New Satellite Tracking Telescope On Line

Ever wonder how various government agencies keep track of all the satellites and assorted refuse floating around in orbit? The following news item from the "Washington Report" column of the July 8, 1982 issue of *Electronic Design Magazine* allows a glimpse.

"A computer-driven telescope designed to track satellites as far out as 22,000 miles has been put into operation at the White Sands Missile Range near Socorro, N.M. The scope, which can detect objects as small as a soccer ball in space, was developed by TRW, Inc. (Newbury, Calif.). Called Ground-based Electro-Optical Deep Space Survey (GEODSS), the system is controlled by four Digital Equipment Corp. PDP-11/70's. One hundred images per minute are recorded by a television camera and converted into digital pulses by a custom video processor from Itek Corp. The mainframes then filter out the surrounding stars and display the satellites as streaks of light on CRTs. The telescope is one of five planned around the globe. Korean and Hawaiian sites are to be operational by late summer, and others in the Indian Ocean and eastern Atlantic regions should be up and running by the mid-1980s."

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Fellowship Awarded To Arthur Clarke

The eighth Marconi Fellowship for Communications, Science and Technology was awarded to Arthur C. Clarke, AMSAT LM 2001, for his unique contributions to the invention of the communications satellite. Presented by Prince Claus of the Netherlands in the Hall of the Parliaments, The Hague, on June 11, the award reads, "Cited for first specifying in detail the potentialities and technical requirements for the use of geostationary satellites for global communications; for other innovations in communications and remote sensing from space throughout a lifetime of promoting the benevolent use of advanced space technology."

Mr. Clarke looks forward to using a major part of the \$35,000 grant at the proposed Centre for Third World Communication, Energy and Space Technologies, at the University of Moratuwa, near Columbo, Sri Lanka, of which he is chancellor. The Sri Lankan government is now seeking funding for this Centre from UNESCO's I.P.D.C. programme and other sources.

The previous seven Fellows include Dr. James Killian and Dr. Seymour Papert of MIT, Professor Arthur Schawlow (co-inventor of the laser), Dr. John Pierce (father of Telstar), and Professor Yash Pal (director of the Indian educational satellite program, and now Secretary-General of the UN Conference on the Peaceful Uses of Outer Space). Mr. Clarke will be giving a lecture, "Space—Imagination and Reality," at UNISPACE on August 10 in Vienna.

DXpedition To St. Paul Nets Dozens of QSOs On Birds

Although they got off to a ragged start on Friday evening when their satellite rig broke down, Jerry Hull and crew at VE1SPI on St. Paul Island managed to get on by Saturday afternoon, 10 July. Heard and worked by dozens on RS-6 and RS-8, the rare new country DX was on through at least Sunday, 11 July. Congratulations to the VE1SPI crew and to all those who obtained the new prefix. "Unofficially," according to veteran W2BXA, "VE1SPI makes 115 for me!"

Ivory Coast Station Worked

Ivory Coast station TU2IT is active on the amateur satellites as is evident by reports received by ASR recently. Jim Buckley, WA1ZUB, worked TU2IT from his Massachusetts QTH on Sunday, 18 July. The QSO occurred on a 34 degree (EQX) orbit of RS-6. The operator at TU2IT was Mike. Watch for this station in the future. He is especially enthusiastic about satellite communications and wishes to work as many DX stations as possible. Thanks WA1ZUB.